

What is claimed is:

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- SUBA17
1. A drilling machine for drilling a string of drill rods into the ground when in a drilling mode and for removing the string of drill rods from the ground when in a pull-back mode, the drilling machine comprising:
 - a rod driver for pushing the drill rods into the ground and for pulling the drill rods from the ground;
 - lower and upper vice grips for making and braking joints between the drill rods;
 - a magazine for storing the drill rods;
 - a rod transfer member for moving rods from the magazine to the rod driver when the drilling machine is in the drilling mode, and for moving rods from the rod driver to the magazine when the drilling machine is in the pull-back mode, the rod transfer mechanism including a rod receiving location, the rod transfer mechanism being movable between an extended position where the rod receiving location is positioned adjacent to the rod driver and a retracted position where the rod receiving location is positioned adjacent the magazine;
 - a control station including first and second operator actuated switches;
 - the first switch that, when actuated while the drilling machine is in the pull-back mode, initiates a rod transfer sequence that brings the rod transfer member to the retracted position; and
 - the second switch that, when actuated while the drilling machine is in the pull-back mode, simultaneously initiates: a) a vice grip sequence that causes the upper vice grip to move to a clamped position; and b) a rod transfer sequence that brings the rod transfer member to the extended position.
 2. The drilling machine of claim 1, further comprising a joystick on which the first and second switches are mounted.

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4. The drilling machine of claim 2, further comprising an operator chair, wherein the first switch is mounted on the joystick so as to face away from the operator chair and the second switch is mounted on the joystick so as to face toward the operator chair.

5. The drilling machine of claim 2, further comprising third and fourth switches mounted on the joystick, wherein the first, second, third and fourth switches control all rod transfer member sequences and all vice grip sequences.

6. The drilling machine of claim 1, further comprising a third operator actuated switch that, when actuated while the drilling machine is in the drilling mode, simultaneously initiates: a) a vice grip sequence that causes the lower vice grip to move to an unclamped position; and b) a rod transfer sequence that brings the rod transfer member to the retracted position.

7. The drilling machine of claim 5, wherein the first, second, third and forth switches are arranged to face toward an operator and are arranged generally in a row, wherein the switches are depressed sequentially to break a joint and move a rod from the rod driver to the magazine during pull-back operations, and wherein the switches are depressed sequentially to move a rod from the magazine to the rod driver and to make a joint during drilling operations.

8. The drilling machine of claim 1, wherein the rod driver includes a rotational drive head mounted on a track, and wherein the drilling machine further comprises a sensing arrangement for detecting a position of the rotational drive head along a length of the track.

9. The drilling machine of claim 8, wherein the sensing arrangement includes 3 proximity sensors and 3 flags configured for detecting when the rotational drive head is positioned adjacent at least 7 different positions along the length of the track.

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10. A method for operating a drilling machine including a rod grip and a longitudinal driver, the method comprising:

adjusting the available thrust that can be provided by the longitudinal driver depending upon whether the rod grip is clamped or unclamped.

11. The method of claim 10, further comprising limiting the available thrust to a value that prevents thread damage when the rod grip is clamped.

12. The method of claim 11, further comprising increasing the available thrust when the rod grip is unclamped.

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